Deer Density on Blackwater NWR

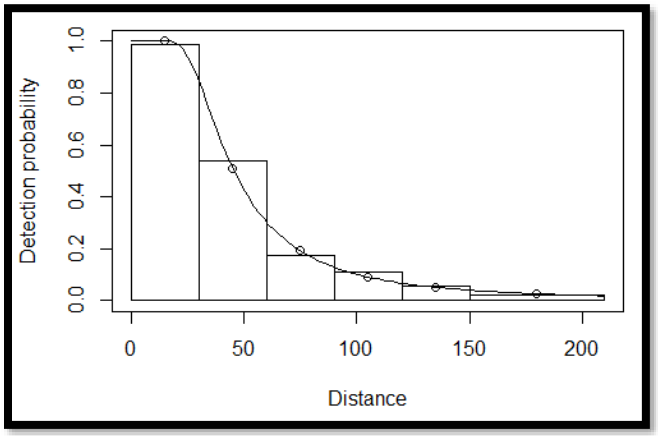
Results from Distance Sampling Surveys

Dr. Jacob M. Haus
Dr. Jacob L. Bowman

University of Delaware | College of Agriculture & Natural Resources
Department of Entomology & Wildlife Ecology

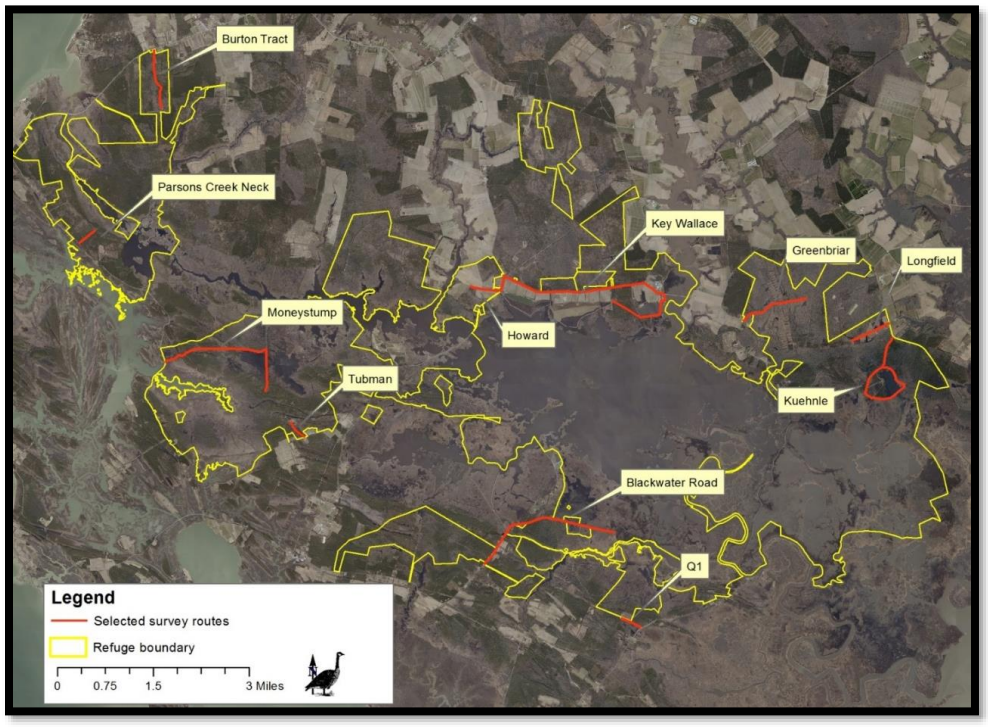
What is distance sampling?

Road distance sampling is a widely used method for estimating the density of biological populations. The observer performs a standardized survey along a series of road transects searching for deer or groups of deer. For each group, they record the distance from the transect. Not all the deer that the observer passed will be detected. Deer become harder to detect with increasing distance from the transect, resulting in fewer detections with increasing distance. The key to distance sampling analyses is to fit a detection function to the observed distances, and use this fitted function to estimate the proportion of objects missed by the survey. Once we estimate how many animals were not detected, we can combine that estimate with the number of animals that were observed to estimate the density of objects within the surveyed area.



Surveys on Blackwater

We used forward-looking infrared sensors to continuously survey for deer along 24.3 miles of roadside within Blackwater National Wildlife Refuge 5 times during September 2017. Road transects were selected to be representative of the available habitat within the refuge. We observed 240 detections of deer groups, for a total of 450 individual deer. The number of deer in each group, age classes (fawn vs. adult), sex (adults only), and species (white-tailed vs. sika deer) were recorded and distance to the road was measured with a rangefinder. We estimated deer density using 'distance' package in the statistical software program R



Results from the Survey

Category	Estimate	Std. Error	CV	Lower 95% CI	Upper 95% CI	DF
Overall (WTD + sika)	70.77	5.42	8%	60.25	83.13	17.93
Ag. fields (WTD + sika)	46.16	11.28	24%	25.56	83.32	5.93
Forest (WTD + sika)	66.49	9.10	14%	49.37	89.55	11.60
Sika Only	54.18	4.58	8%	45.39	64.67	20.04

Estimates in the above table are presented in number of deer per mile^2. We found no difference in density between habitat types (agriculture vs. forested). Results of the distance surveys are comparable to estimates from herd reconstruction models using harvest data. We also estimated sika deer population demographics; stag-to-hind ratio was 1:2.02 and calf recruitment was 0.57 calves per adult hind.

What is next?

The benefit of distance sampling is the relatively affordability and repeatability of the protocol. This allows surveys to be run in successive years to reliable measure trends in population abundance and responses to management practices. Blackwater NWR plans to use the methods established from this research to monitor deer population trends over time.

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